

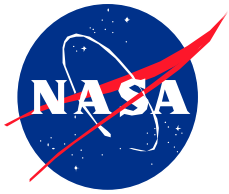
AETD Safety Awareness Campaign

PRESSURE SYSTEMS SAFETY

Stanley Chan/540

Warren Thomas/540.5 ManTech

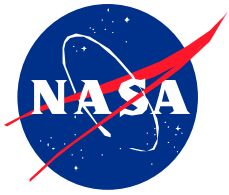
12-7-2005 (R)



OVERVIEW



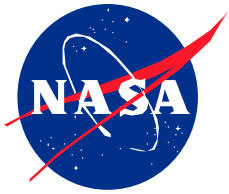
➤ PURPOSE OF THIS PRESENTATION -----	3
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PURPOSE OF THIS PRESENTATION



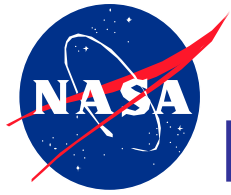
- **To heighten audience awareness on pressure systems safety**
- **Center policy requirements**
- **Safety Do's and Don'ts**



BACKGROUND



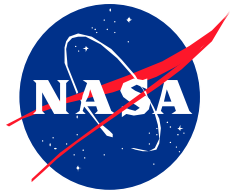
- **The Ground-based Pressure Vessels & Pressurized Systems (PV/S) RECERT Program was instituted at GSFC in 1978.**
- **Coverage:**
 - **Greenbelt: Main & East Campuses; Areas 100, 200, 300, 400.**
 - **WFF: Main Base, Wallops Island; NSBF - Palestine, TX, & Ft. Sumner, NM; PFRR - Fairbanks, Alaska.**



PV/S RECERT REQUIREMENT DOCUMENTS



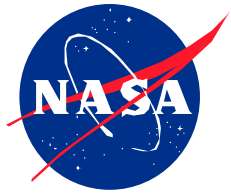
- **OSHA 29CFR1960, 29CFR1910.169, et al.**
- **NPD 8710.5 (Policy for PV/S Safety).**
- **NPR 8715.3 (Safety Manual).**
- **NPR 8715.4 (ISI of PV/S - in revision).**
- **GPR 8710.3 (Cert & Recert of PV/S).**



PV/S RECERT REQUIREMENT NUTSHELL



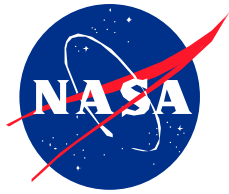
- **Applies to NASA-owned or operated ground-based PV/S (including vacuum systems) at GSFC and WFF (with certain exceptions).**
 - **Systems: cryogenics, compressed air, compressed gases, vacuum chambers, hydraulic, jet fuel, elevated water storage tanks.**
 - **Components: vessels, piping & tubing, pipe/tube supports, flex hoses, relief valves, gages.**
 - **Included in RECERT commencing in FY05: purge carts & panels, PETS, temporary R&D setups.**



PV/S RECERT REQUIREMENT NUTSHELL (Cont'd)



- **All ground-based PV/S are required to be Certified by RECERT prior to use and Recertified periodically.**



SAMPLE PV/S RECERT TAGS



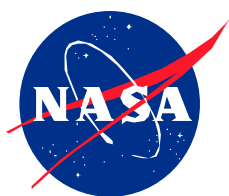


**GODDARD SPACE FLIGHT CENTER
RECERTIFICATION PROGRAM
CERTIFIED**

In accordance with NASA requirements and GMI 1710.4 periodic in service inspections have been performed by RECERT Support on _____
To pressure system Number: _____ and certified in accordance with the following checked of applicable procedures.

- ☐ NMP-103, External Visual Examination
- ☐ NMP-105, Pressure Gage Certification
- ☐ NMP-106, Relief Valve Certification
- ☐ NMP-109, UT Thickness Measurements
- ☐ NMP-101, Mag Particle Inspection
- ☐ NMP-102, Dye Penetrant Inspection

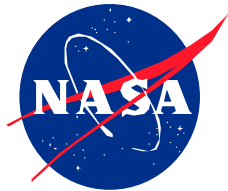
If there is a problem with or a question regarding this vessel, contact RECERT Support at extensions: (301) 286-5181.
Report Number _____ Due Recertification _____



SAMPLE PV/S RECERT TAGS



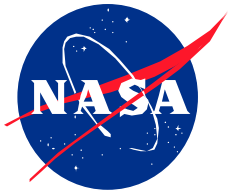
<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM CERTIFIED FLEX HOSE INSPECTION TAG I.D. # _____ MAWP: _____ INSPECTION DATE: _____ DUE RECERT: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 285-5181</p>	<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM CERTIFIED GAGE VT INSPECTION TAG I.D. # _____ MAWP: _____ ACCUR: _____ INSPECTION DATE: _____ DUE RECERT: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 286-5181</p>
<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM DYE PENETRANT INSP. TAG PROJECT: _____ I.D. # _____ INSPECTION DATE: _____ TYPE: _____ METHOD: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 286-5181</p>	<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM CERTIFIED FLEX HOSE VT INSPECTION TAG I.D. # _____ INSPECTION DATE: _____ DUE RECERT: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 285-5181</p>
<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM CERTIFIED RELIEF VALVE INSPECTION TAG I.D. # _____ SET PRESSURE: _____ INSPECTION DATE: _____ DUE INSPECTION: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 286-5181</p>	<p>GODDARD SPACE FLIGHT CENTER RECERTIFICATION PROGRAM CERTIFIED GAGE INSPECTION TAG I.D. # _____ MAWP: _____ ACCUR: _____ INSPECTION DATE: _____ DUE RECERT: _____ REPORT # _____ INSPECTOR: _____ RECERT SUPPORT: (301) 286-5181</p>



Required PV/S Documentation



- If currently in operation:
 - Risk Assessment
 - Request for Variance for continued operation
- In addition before we can certify a system we need (as applicable):
 - A. Building #, Room #, and/or (location):
 - B. Manufacturing Data Reports (MDR) MDR Form U-1A (should have been supplied or can be obtained from the vendor):
 - C. Piping (as applicable)
 - 1. Design and operating conditions
 - 2. Material Specification (ASTM or ASME)
 - 3. Pipe/tubing Size:
 - 4. Pipe/tubing Wall thickness
 - 5. Pipe/tube fitting type and class (socket weld, butt weld, threaded, mechanical (swage),
 - 6. Valve type, manufacturer, model number, material of construction (body,stem, seat(s), pressure and temperature rating
 - 7. Overpressure protection: Manufacturer, model number, type, size, capacity, set point, seat material
 - 8. Pressure Regulators: Manufacturer, model number, type (single stage, dual stage), material, size, max inlet pressure, max outlet pressure
 - 9. Pressure gages: Manufacturer, model number, inlet size, range
 - 10. As-built P&ID
 - 11. C of C from fabricator and/or installer that the System meets the Code fabrication and installation requirements
 - 12. Record of Code-required NDT
 - 13. Record of Code-required pressure test



PV/S TESTS & INSPECTIONS

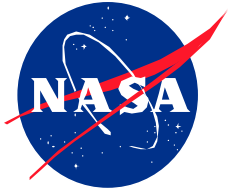


➤ PV/S Tests:

- Pneumatic & hydrostatic pressure tests.
- Relief valve set point certification.
- Selected pressure gage calibration.
- Intervals vary by component and contained medium, and currently range from 1 to 2 years.

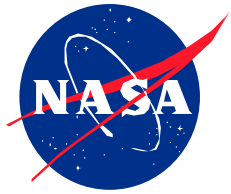
➤ PV/S Inspections:

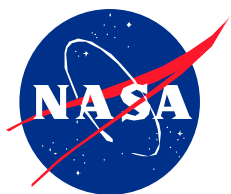
- System & component VT, PT, MT, UT.
- Intervals vary by component and contained medium, and currently range from 1 to 10 years.

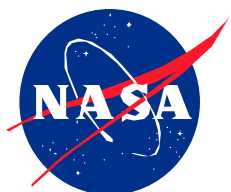


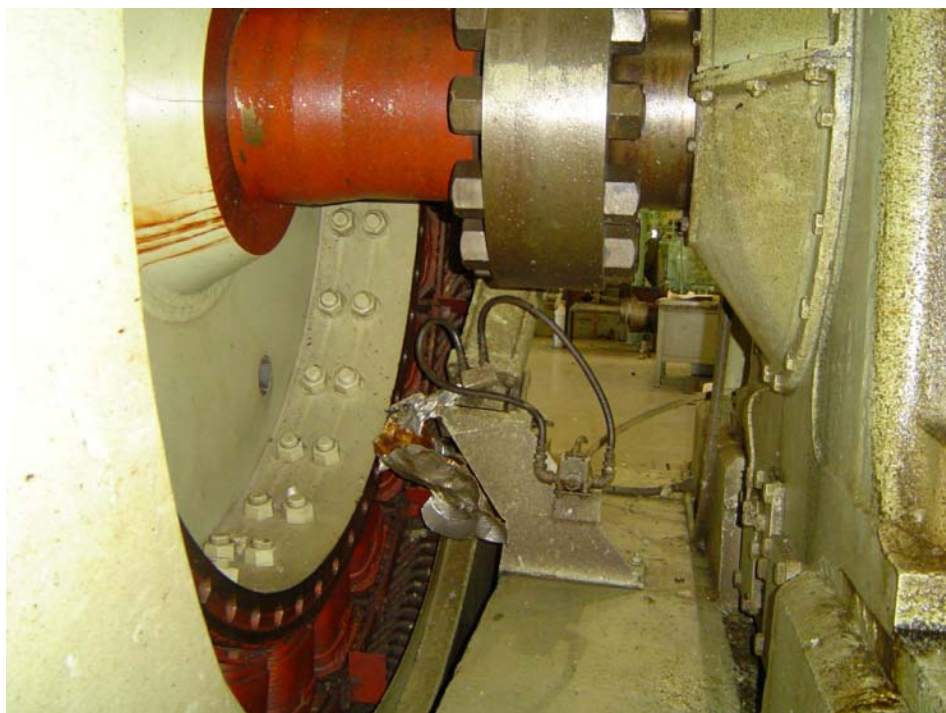
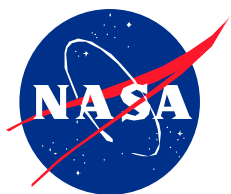
LESSONS LEARNED

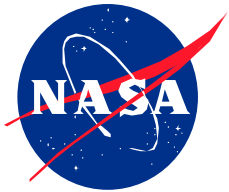


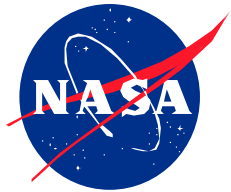


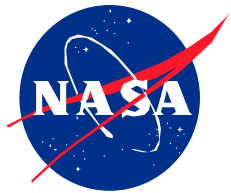


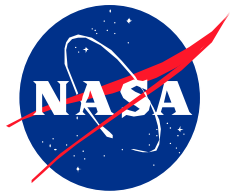


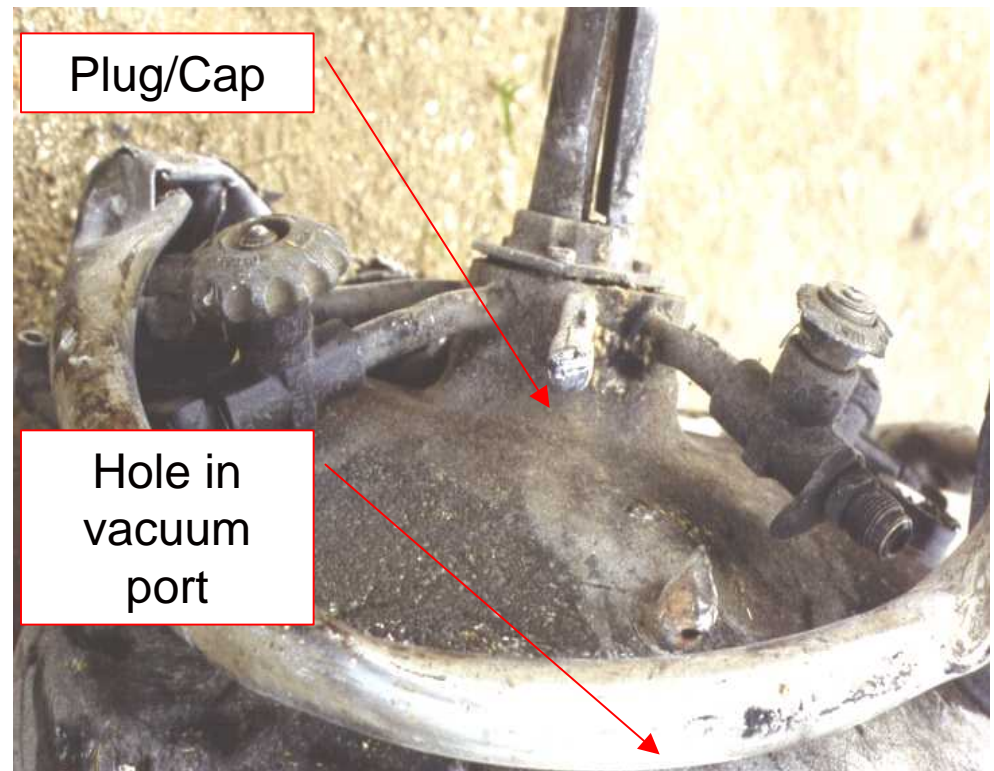
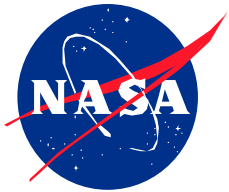


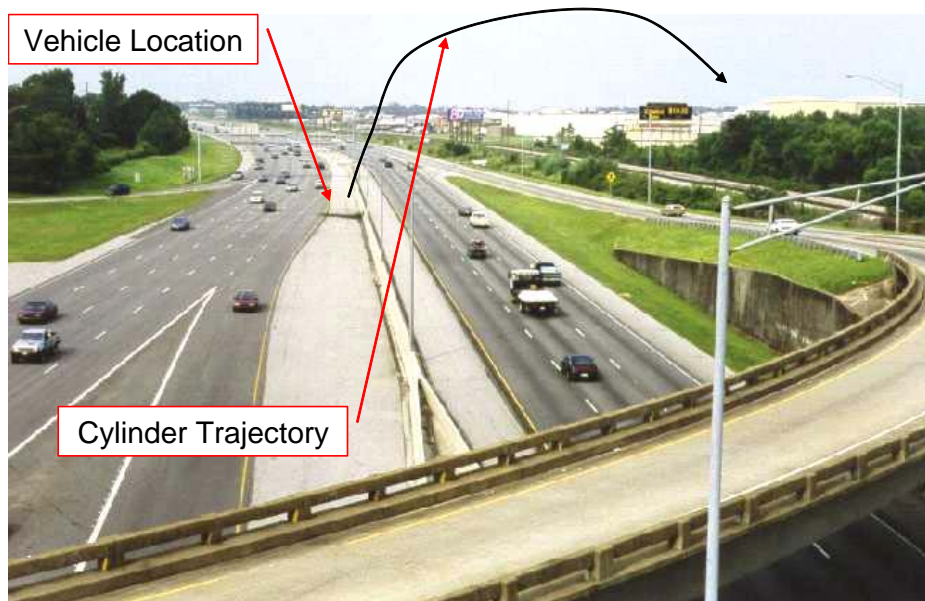
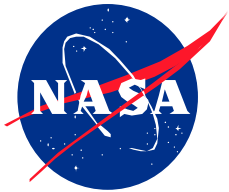


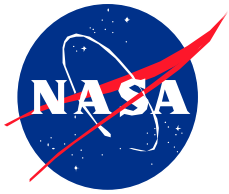


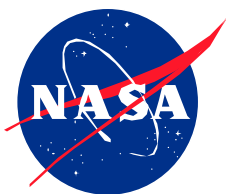












THE SLEEPING GIANT

I AM A HIGH PRESSURE, COMPRESSED GAS CYLINDER



I stand 57 inches tall.
 I am 9 inches in diameter.
 I weigh in at 155 pounds when filled.
 I am pressurized at 2,200 pounds per square inch (psi).
 I have a wall thickness of about 1/4 inch.
 I wear a regulator and hose when at work.
 I wear a label to identify the gas I'm holding. My color is not the answer.
 I transform miscellaneous stacks of material into glistening ships and many other things—when properly used.
 I may transform glistening ships and many other things into miscellaneous stacks of material—when allowed to unleash my fury unchecked.
 I can be ruthless and deadly in the hands of the careless or uninformed.
 I am too frequently left standing alone on my small base without other visible means of support—my cap removed and lost by an unthinking workman.
 I am ready to be toppled over—when my naked valve can be damaged or even snapped off—and all of my power unleashed through an opening no larger than a lead pencil.
 I am proud of my capabilities—here are a few of them:
 —I have on rare occasions been known to jetaway—faster than any dragster.
 —I might smash my way through brick walls.
 —I might even fly through the air.
 —I may spin, ricochet, crash and slash through anything in my path.
 You can be my master only under these terms:
 —Full or empty—see to it that my cap is on, straight and snug.
 —Never—repeat—never leave me standing alone. Secure me so that I cannot fall.

REMOVABLE METAL CAP

BRONZE VALVE

SAFETY DEVICE

PRESSED STEEL NECK RING

8 1/2" — I.D.

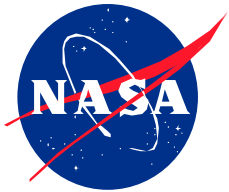
9" — O.D.

51"

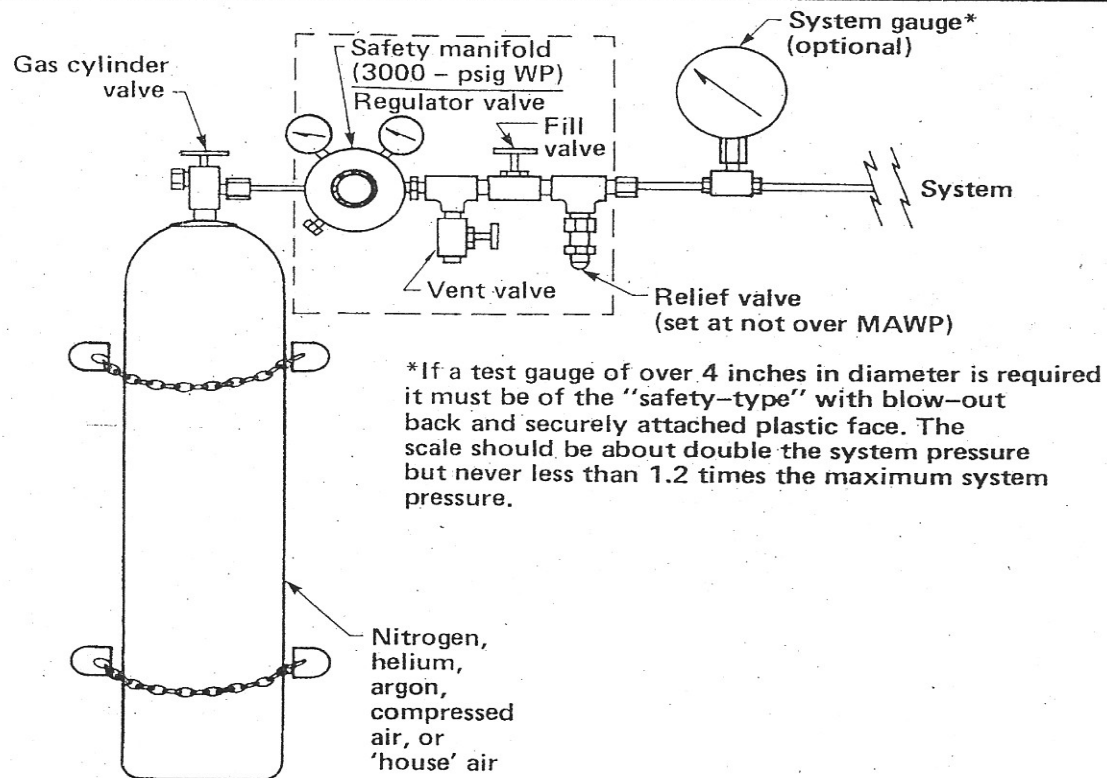
OXYGEN CAPACITY OF CYLINDER
 244 CU. FT.
 AT 2200 LB. PER SQ. IN. PRESSURE
 AT 70°F

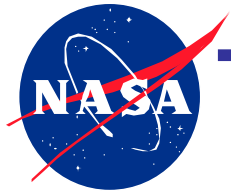
"TREAT ME WITH RESPECT—I AM A SLEEPING GIANT."

COURTESY OF UNION CARBIDE WELDING AND GAS PRODUCTS



SAFETY MANIFOLD SYSTEM



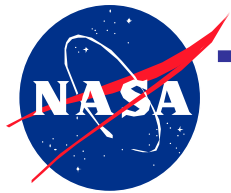


TO ASSURE PV/S SAFETY



➤ Do's

- Design, Procure, and install to Code and NASA requirements
- Submit design to RECERT/540 for Code compliance review and approval prior to implementation
- PV/S must be Certified prior to operation
- Operate and maintain PV/S per OEM recommendations
- Contact RECERT if you need technical assistance at x6-5183 or x6-4209

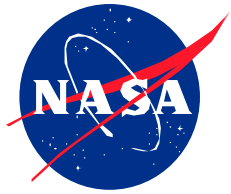


TO ASSURE PV/S SAFETY



➤ Don'ts

- Proceed with procurement without design approval by RECERT/540
- Procure non-ASME vessels
- Operate PV/S without valid Certification
- Ignore OEM recommended maintenance requirements
- Modify system without RECERT approval



RECERT ON-LINE DOCUMENTS & CONTACTS



➤ Please visit:

<http://mscweb.gsfc.nasa.gov/549web/recert/recert.htm>